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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/673,388	09/30/2003	Chih-Tsung Shih	1651-0163P	3746
2292	7590	08/25/2005	EXAMINER	
BIRCH STEWART KOLASCH & BIRCH			LAVARIAS, ARNEL C	
PO BOX 747			ART UNIT	
FALLS CHURCH, VA 22040-0747			PAPER NUMBER	

2872

DATE MAILED: 08/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/673,388

Applicant(s)

SHIH ET AL.

Examiner

Arnel C. Lavarias

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 June 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 June 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Amendment***

1. The amendments to Claims 1-6 in the submission dated 6/15/05 are acknowledged and accepted.
2. The cancellation of Claims 7-8 in the submission dated 6/15/05 is acknowledged and accepted.
3. In view of the amendments made to the claims above, the objections to the claims in Section 10 of the Office Action dated 3/15/05 are respectfully withdrawn.

### ***Drawings***

4. The replacement drawings were received on 6/15/05. These drawings are acceptable.

### ***Specification***

5. The substitute specification filed 6/15/05 has been entered since it conforms to 37 CFR 1.125(b) and (c). In view of the amendments made to the specification of the disclosure, the objections to the specification in Section 9 of the Office Action dated 3/15/05 are respectfully withdrawn.

### ***Response to Arguments***

6. The Applicants argue that, with respect to newly amended Claim 1, Tehrani fails to teach or reasonably suggest a tunable filter, including at least a MEMS-based reflector

interposed between the first and second collimators, the reflector comprising a base, an aperture defined in the base, and a multilayered film with high reflection capability formed on the base and extending over the aperture, wherein the multilayered film extending over the aperture serves as a curved lens. After reviewing of the Tehrani reference, the Examiner agrees, and respectfully withdraws the rejections in Sections 12-17 in the Office Action dated 3/15/05.

7. Claims 1-6 are now rejected as follows.

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1, 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fan (U.S. Patent No. 6807342) in view of Tehrani (U.S. Patent No. 5430574), of record.

Fan discloses a tunable filter (See Abstract; Figures 2, 4; col. 2, line 13-col. 3, line 17) with a wide free spectral range, comprising a first optical fiber (See for example 24 in Figure 2, 24' in Figure 4); a second optical fiber (See for example 22 in Figure 2, 22' in Figure 4) with one end opposed to the first optical fiber, wherein a high reflectivity layer (See for example 19 in Figure 2, 19' in Figure 4) is coated on the end of the second optical fiber (See for example 19' in Figure 4); and a MEMS-based reflector (See for example 12, 13, 14, 16, 18, spacer between 16 and 13 in Figure 2; 13, 14, 18', spacer and

grounded layer in Figure 4) interposed between the first optical fiber and the second optical fiber, the reflector comprising a base (See for example 16 in Figure 2), an aperture (See central portion of layer 16) defined in the base, and a multilayered film (See 12, 18 in Figure 2) with high reflection capability formed on the base and extending over the aperture, wherein the multilayer film extending over the aperture serves as a curved lens (See Figures 2, 6), and a resonance cavity is defined between the curved lens and the second collimator. Fan further discloses the multilayered film formed with alternate layers of GaAs and AlAs or alternate layers of  $\text{TiO}_2$  and  $\text{SiO}_2$  (See col. 2, lines 22-65); the tunable filter being an electrostatic actuated type filter (See col. 2, lines 22-65), and the MEMS based reflector further comprising a dielectric layer and an electrode layer sequentially formed on the base, both the dielectric layer and the electrode layer having an opening corresponding to the aperture (See for example 13, 14 in Figure 2); and the first optical fiber having one end extending toward the second optical fiber (See for example 22, 24 in Figure 2; 22', 24' in Figure 4). Fan lacks the first and second optical fibers including collimators. However, Tehrani teaches a tunable filter with a wide free spectral range (See for example Figures 3-7), comprising a first collimator on a first optical fiber (See 14 in Figure 3); a second collimator on a second optical fiber and opposed to the first collimator (See 15 in Figure 3); and a mirror (See 21 in Figure 3) interposed between the first and second collimators, with an appropriate tilt angle (It is noted that the surface of the mirror at the point of light incidence is tilted orthogonally to the propagation axis of the incident light) and a high reflectivity lens, such as a concave lens (It is noted that the mirror 21 provides a surface with a concave curvature which will

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also inherently provide a lensing/focusing function to the incident light reflected back from element 21 in Figure 3), whereby a resonance cavity is defined in a space between the mirror and the second collimator (See space between 21 and 22 in Figure 3). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the first and second optical fibers of the tunable filter of Fan include collimators, as taught by Tehrani, for the purpose of mode matching and focusing the incident light to reduce optical losses.

10. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fan in view of Tehrani as applied to Claim 1 above, and further in view of Domash (U.S. Patent Application Publication US 2003/0072009 A1), of record.

Fan in view of Tehrani discloses the invention as set forth above in Claim 1, except for the tunable filter being a heat actuated type filter. However, the use of heat-, piezoelectric-, and electrostatic-based actuators to adjust the Fabry-Perot reflector spacing to provide center wavelength tunability is well known and conventional in the art. For example, Domash et al. teaches a tunable thin film Fabry-Perot filter (See for example 101 in Figure 1), wherein central wavelength tunability is provided for by the use of a heat conducting film resistor deposited onto the Fabry-Perot filter, the film resistor being connected to a temperature controller (See 102 in Figure 1; Figures 3-9; Paragraphs 0059-0068). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the tunable filter of Fan in view of Tehrani be a heat actuated type filter, as taught by Domash et al. for the purpose of

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providing rapid, repeatable, and wide shifts in the transmission wavelengths of the filter without use of moving parts.

11. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fan in view of Tehrani as applied to Claim 1 above, and further in view of Huang (U.S. Patent No. 6263128), of record.

Fan in view of Tehrani discloses the invention as set forth above in Claim 1, except for an antireflection layer coated on the end of the first collimator. However, the use of antireflective coatings of surfaces of optical elements, such as collimators and lenses, are well known and standard practice in the art. For example, Huang teaches a particular embodiment of a Fabry-Perot etalon filter (see for example Figures 6-7), wherein the surfaces of one or both of the collimators (See 71, 72 in Figure 7) may be coated with an antireflective film (See 77 in Figure 7). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have an antireflection layer be coated on the end of the first collimator, as taught by Huang, in the tunable filter of Fan in view of Tehrani, for the purposes of reducing optical noise due to unwanted back reflections in the incident signal.

***Conclusion***

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arnel C. Lavarias whose telephone number is 571-272-2315. The examiner can normally be reached on M-F 9:30 AM - 6 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

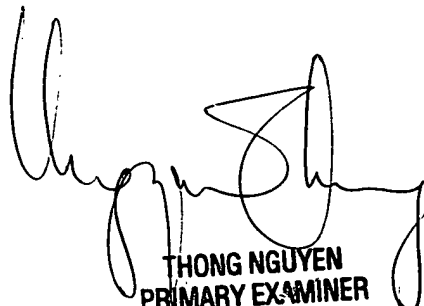


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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Arnel C. Lavarias  
8/22/05



THONG NGUYEN  
PRIMARY EXAMINER  
GROUP 2800



"REPLACEMENT SHEET"

4/6

*Drawing Changes*  
*Approved*  
*AC*  
*8/19/05*

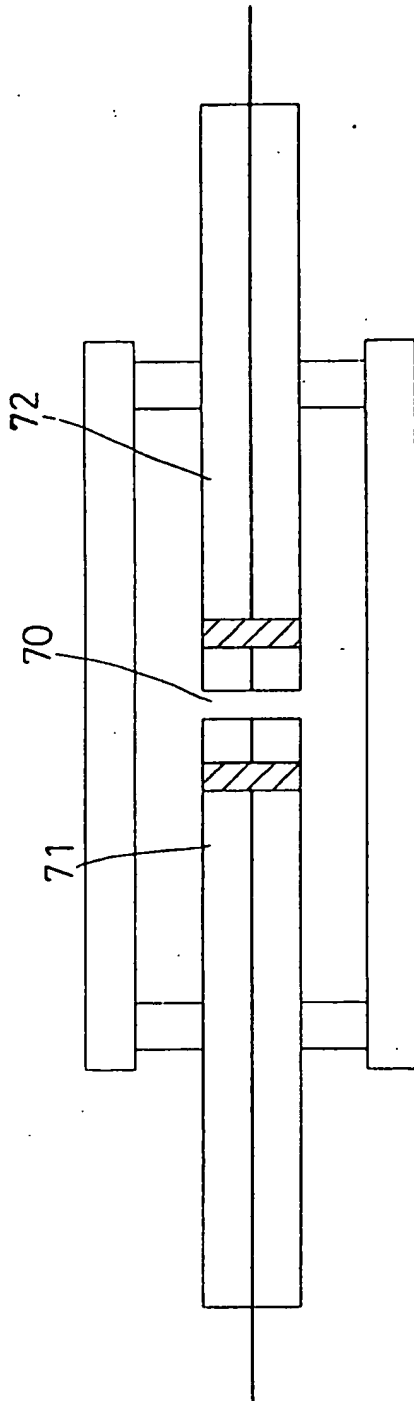


FIG. 5  
PRIOR ART

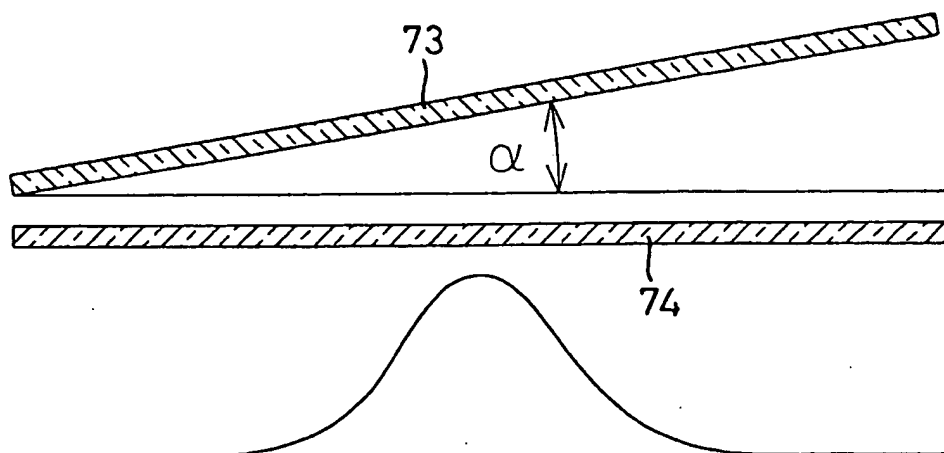


FIG.6  
PRIOR ART

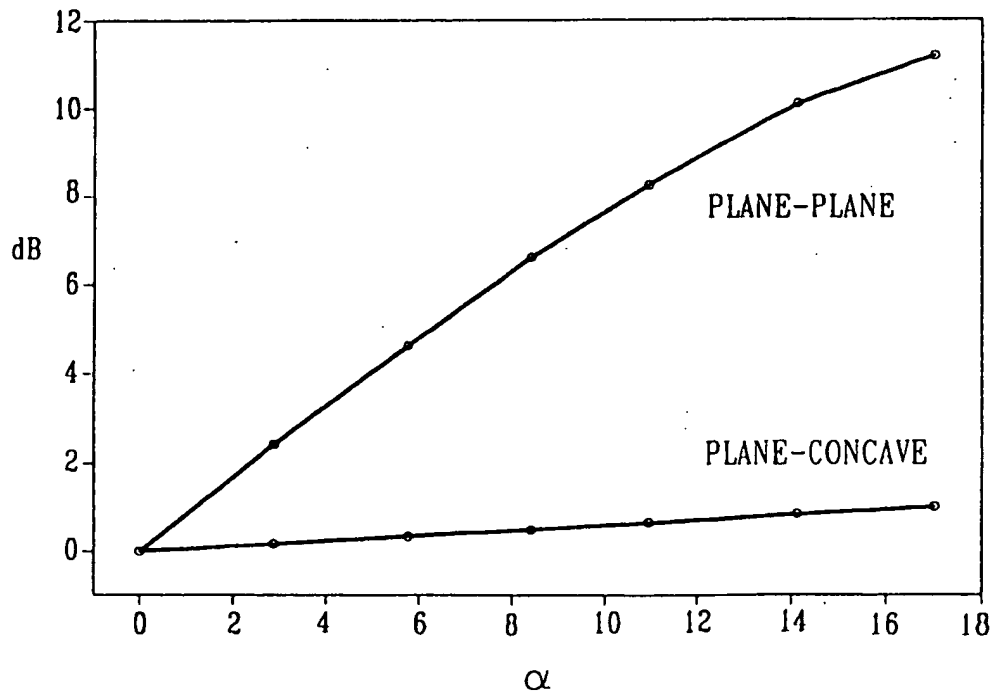


FIG.7  
PRIOR ART

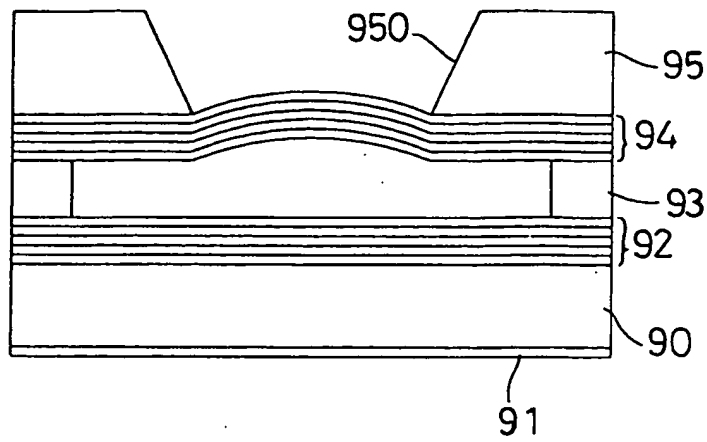


FIG. 9  
PRIOR ART

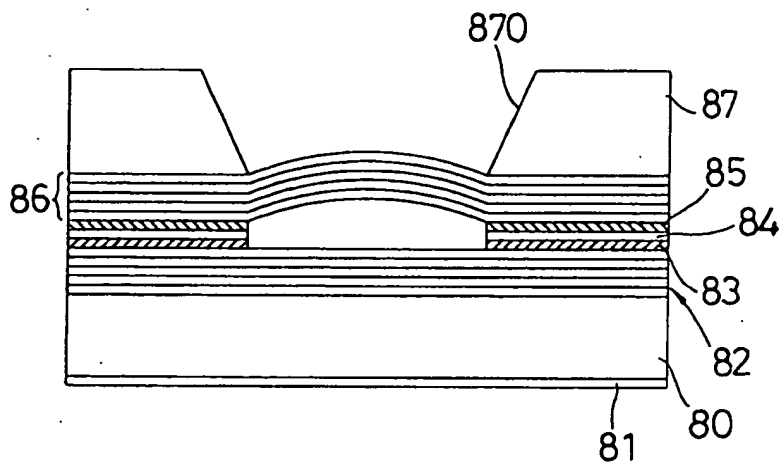


FIG. 8  
PRIOR ART